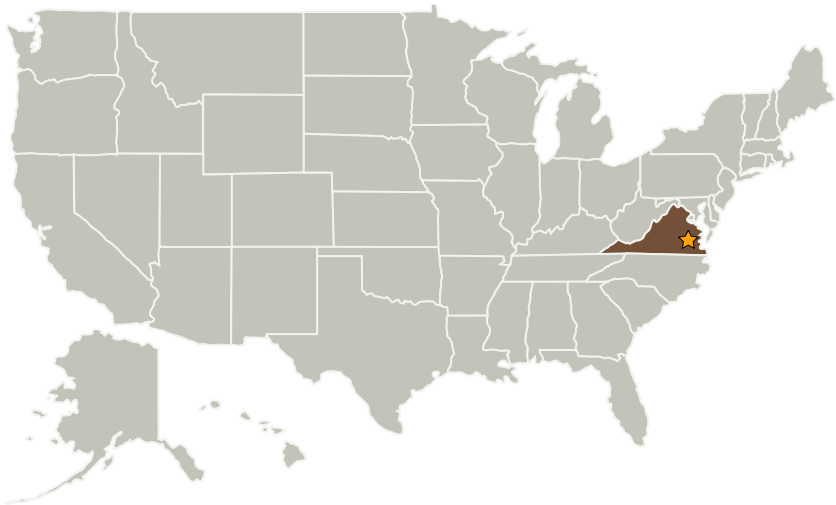
Hydrogen-Rich, Multifunctional Polymeric Nanocomposites for Radiation Shielding, Phase I

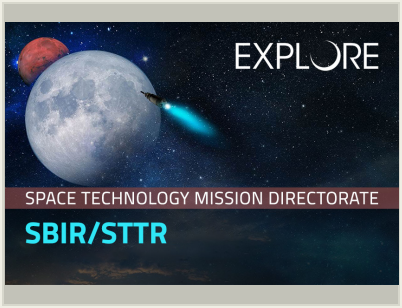
Completed Technology Project (2008 - 2008)

Project Introduction

NASA has identified the need for the development of lightweight structures technologies to support Lunar Lander and Lunar Habitats programs and for the transfer of relevant technology to Crew Exploration Vehicle and Crew Launch Vehicle programs. NASA further calls for revolutionary advances in radiation shielding materials and structures technologies to protect humans from the hazards of space radiation during NASA missions. To address this need and in response to NASA Subtopic X6.03, International Scientific Technologies, Inc. in conjunction with the College of William and Mary, proposes the development of hydrogen-rich monomers for high performance polymers, such as polyimides, and the incorporation of metallic nanoparticles to form nanocomposite materials having multifunctional properties. The Phase I Technical Objectives include preparation of hydrogen-rich monomers, fabrication of polymeric nanocomposite films, and acquisition of test data to determine key parameters for optimal radiation-shielding materials. The anticipated result of the Phase I and Phase II programs is the development of polymeric nanocomposite materials consisting of hydrogen-rich monomers and metallic nanoparticles. The nanocomposite materials have multifunctional properties of radiation shielding against galactic cosmic radiation, neutrons and electromagnetic radiation, structural integrity to permit use in flexible and rigid structures and habitats, and electrical conductivity for electrostatic control to be used in dust mitigation during lunar missions.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
International Scientific Technologies, Inc.	Supporting Organization	Industry	Dublin, Virginia

Primary U.S. Work Locations
Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Russell Churchill

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.6 Other Advanced Concepts for Generating/Converting Power